



APPENDIX F: Real Estate

LAKE WORTH INLET  
*Palm Beach Harbor*

**APPENDIX F**

**LAKE WORTH INLET  
PALM BEACH COUNTY, FLORIDA  
NAVIGATION STUDY  
FEASIBILITY REPORT**

**REAL ESTATE PLAN**

July 11, 2013

**LAKE WORTH INLET  
PALM BEACH COUNTY, FLORIDA  
NAVIGATION STUDY  
FEASIBILITY REPORT**

**REAL ESTATE PLAN**

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12/2012 lhz  
Rev 3/22/2013 lhz  
Rev 7/11/13 lhz

**REAL ESTATE PLAN  
LAKE WORTH INLET  
PALM BEACH COUNTY, FLORIDA  
NAVIGATION STUDY  
FEASIBILITY REPORT**

**1. STATEMENT OF PURPOSE.**

- a. The purpose of this report is to determine the feasibility of improving the existing Federal navigation project at Lake Worth Inlet, Florida.
- b. This real estate plan is tentative in nature for planning purposes only and both the final real property acquisition lines and estimates of value are subject to change even after approval of this report.

**2. PROJECT AND STUDY AUTHORIZATION.**

The non-Federal sponsor, the Port of Palm Beach, requested a feasibility study to focus on evaluating deepening and widening of the entrance channel and the large turning basin. A 905(b) Analysis was approved for proceeding into the feasibility phase of planning on March 29, 2001. The memorandum can be found in Appendix F. The Port of Palm Beach applied for a state grant to assist in the 50% non-Federal share, the FCSA was then signed in August 2005. Since signing of the FCSA in 2005, the schedule has been linked to the appropriations received.

House Resolution dated June 25, 1998, authorized the Lake Worth Inlet study. The full text of the resolution is as follows:

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army is requested to review the report of the Chief of Engineers on the Palm Beach Harbor, Florida, published as House Document 283, 86<sup>th</sup> Congress, 1<sup>st</sup> Session, and other pertinent reports, with a view of determining if the authorized project should be modified in any way at this time, with particular reference to widening the existing interior channel through Lake Worth Inlet.

See Exhibit F-1 of this appendix for additional project authorizations.

**3. PROJECT LOCATION AND DESCRIPTION.**

Lake Worth Inlet (LWI), also known as the Palm Beach Inlet, is located in Palm Beach County, Florida, and is approximately 80 miles north of Miami and 135 miles south from Port Canaveral. The LWI provides access to deep draft vessel traffic using terminal facilities located at the Port of Palm Beach. The inlet is the 4<sup>th</sup> busiest Port in Florida. (See Exhibit F-2 of this appendix for vicinity/location map.)

The present authorized channel for the Palm Beach Harbor Navigation Project includes the following: an entrance channel 35 feet deep, 400 feet wide, and 0.8 miles long, merging with an inner channel 33 feet deep, 300 feet wide and 0.3 miles long, then flaring into a turning basin, 1,400 feet north-south along the side next to the berthing area by a minimum of 1,210 feet east-west; maintenance of a local turning basin to the north of the project turning basin of 24 feet; removal of south point; and jetties and shore revetments at the inlet. The entire length of the project is approximately 1.6 miles. Maintenance of the northern turning basin including the area of slip 1 is authorized to 24 feet; however much of this area is constructed to 33 feet by the non-Federal sponsor.

The recommended (NED) plan for the project includes a new channel flare on the south side of the Entrance Channel, a widening of the Entrance Channel by either 40' or 60' to the north, widening of the Inner Harbor Cuts 1 and 2 to provide for a minimum channel width of 450', a 150' expansion of the Southern (Main) Turning Basin to the south, and an expansion of the Southern (Main) Turning Basin on the north side to remove a notch currently encroaching into the basin. (See page 6, Figure F-1, of this appendix for map of NED plan). The channel would be deepened to a project depth of 39 feet Mean Lower Low Water (MLLW) for the Inner Harbor and 41 feet MLLW for the Entrance Channel. These features are necessary to facilitate the safe and efficient navigation of the design vessel. Additional project features include North Jetty stabilization, reconfiguration of the Advance Maintenance Zones, reconfiguration of the Settling Basin, Seagrass Mitigation Area construction, and Hardbottom Mitigation Area construction. **See Engineering Appendix A for additional details.**

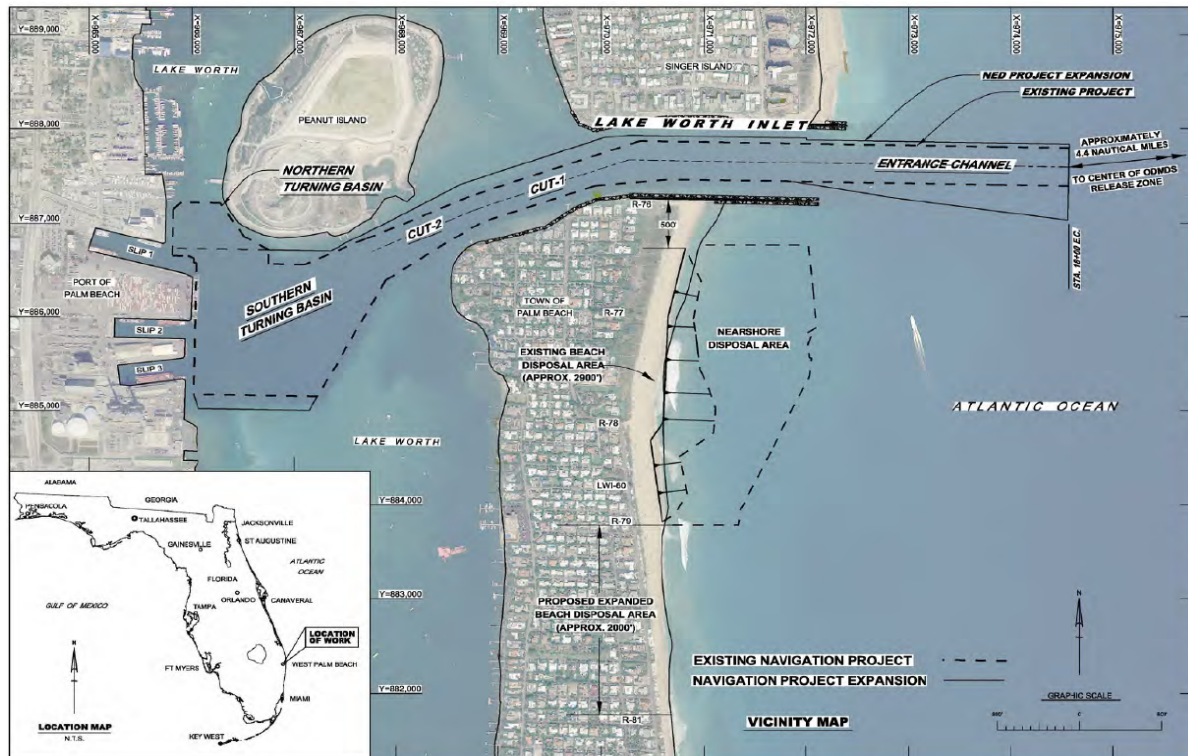
The primary disposal sites for the excavated material, except encountered hardbottoms (rock), include an existing Ocean Dredged Material Disposal Site (ODMDS), nearshore disposal areas (below the mean high water line (MHWL), and the potential seagrass mitigation areas. The ODMDS is located approximately 4.4 nautical miles offshore of the Inlet. The nearshore disposal template begins 500 linear feet south of the south jetty, between FDEP coastal reference monuments R-76.5 and R-79. (See Exhibit F-2 of this appendix for maps showing ODMDS, nearshore disposal area, and FDEP Coastal Monument Reference Map).

Further opportunities for additional beneficial use of dredged material exist in the project vicinity such as the filling of anoxic deepwater holes in the Lake Worth Inlet Lagoon, creation of hardbottom habitat, creation of habitat for submerged aquatic vegetation such as seagrasses, and/or placement of beach quality material in the uplands (above the MHWL) south of the Inlet or below MHWL at Mid-Town Beach. These areas are located from FDEP Monument R-76.5 extending to R-81. Mid-Town beach fill template is located between R-90.4 and R-101.4. These options are not included in the recommended plan and if used will be paid solely by the project sponsor and at no cost to the project.

Compensatory mitigation is planned for unavoidable impacts to hardbottom habitats and seagrass communities. Impacts to 4.9 acres of low relief-low complexity (LRLC) hardbottoms are associated with the project deepening and widening. The widening of the entrance channel and existing turning basin will permanently remove 4.5 acres of mixed seagrass beds.

The proposed mitigation plan consists of re-creating between 4.9 and 9.8 acres of hardbottoms and replacing between 8.25 and 11.25 acres of seagrass. Seventeen (17) potential areas within the Lake Worth Lagoon have been identified which have the potential to compensate for the environmental losses from the project. (See Exhibit F-2 for potential mitigation location map).





**Recommended Plan (NED Plan) – Figure F-1**

#### **4. REAL ESTATE REQUIREMENTS.**

The lands required for the deepening of the project are submerged and within the navigable waters of the United States. These lands are available by navigation servitude.

The lands required for the widening of the project are submerged and within the navigable waters of the United States. These lands are available by navigation servitude.

The lands required for the ODMDS and nearshore placement areas are submerged and within the navigable waters of the United States. These lands are available by navigation servitude.

The proposed mitigation lands required for the seagrass replacement and hardbottom re-creation are submerged and within the navigable waters of the United States. These lands are available by navigation servitude.

Port of Palm Beach, the project sponsor, as well as the State of Florida, have conveyed the preference for beach compatible dredged material excavated from the inlet be placed on the beach, both above and below the MHWL. Upland beach placement (above the MHWL) is not a part of the recommended plan and all costs, including administrative costs, will be paid for solely by the project sponsor. Since these beach disposal easements are not part of the recommended plan or project, the project sponsor will not receive any credit for the land costs or administrative costs.

Port of Palm Beach, the project sponsor, in conjunction with the Town of Palm Beach, Florida, have acquired 23 temporary construction easements as part of the existing Palm Beach Harbor Maintenance

Dredging Beach Placement Project. The easements are to expire May of 2015. The easements extend from approximately R-76.5, 2,500 feet to R-79. These parcels have been certified for the Palm Beach Harbor Navigation Project. The easement allows the Federal Government/USACE to nourish, renourish, protect, operate and to perform any other work necessary and incident to the maintenance between the MHWL and vegetation. The existing easements, as well as an additional 20 parcels, (located between R-76 through R-81), are in the process of being extended or acquired for continued disposal placement. All lands seaward of the MHWL is owned by the State of Florida and should be included within the Joint Coastal Permit (JCP). During PED phase if the template within the area described above is filled to capacity then an additional placement area at Mid-Town Beach between R-90.4 through R-101.4 may be used. The material will be placed below the MHWL and no easements will be required. All construction easements from private owners would be acquired and funded solely by the project sponsor or other local interests. This includes all administrative costs. These lands will be certified by the project sponsor prior to project construction if necessary.

Staging and work areas will be within the lands below the designated MHWL line or on previously provided construction easements for the Palm Beach Harbor Project. These lands will be certified for this project prior to advertisement

Federal fee and easement properties located at or near the south jetty acquired for the Palm Beach Harbor Project will be used temporarily for construction purposes. A pipeline from the inlet to the nearshore placement area will require the use of Tract Nos. A-102 (fee) and 108E-5 (perpetual right-of-way easement). No acquisition is required for the use of these lands. (See Exhibit F-2 for Palm Beach Harbor real estate map).

## **5. FEDERALLY-OWNED LAND.**

A pipeline will be placed over Tract Nos. A-102 (fee) and 108E-5 (perpetual right-of-way easement) to transport compatible material to the nearshore area.

## **6. NON-FEDERALLY-OWNED LAND.**

The Port of Palm Beach and the Town of Palm Beach have lands within the project area. They own approximately 154 acres. If the beach above mean high water line is used for the project, the project sponsor will certify these lands and provide at no cost to the project.

## **7. NON-FEDERAL OPERATION/MAINTENANCE RESPONSIBILITIES.**

a. The Local Sponsor shall provide and maintain, at its own expense, all project features other than those for general navigation, including dredged depths commensurate with those in related general navigation features in berthing areas and local access channels serving the general navigation features.

b. The Local Sponsor shall provide to the Government all lands, easements, and rights-of-way, including dredged material disposal areas, and perform, or assure performance of, all alterations or relocations of facilities and utilities (except relocations or alterations of highway bridges and railroad bridges and approaches thereto), determined by the Government to be necessary for maintenance of the Project.

## **8. NON-FEDERAL AUTHORITY TO PARTICIPATE IN THE PROJECT.**



The project sponsor, Port of Palm Beach, Florida, is a sub-division of the State Division and was established under provisions of Laws of Florida Acts of 1915, Chapter 7081, as amended and supplemented. The Port of Palm Beach entered into a tri-party interlocal agreement in August 2006 with the Town of Palm Beach and Palm Beach County to share local costs of the navigability of the Lake Worth Inlet. This agreement expires September 30, 2016.

#### **9. NAVIGATION SERVITUDE.**

Lands required for deepening and widening of the project of the project are within the navigable water of the United States and are available by navigation servitude. The proposed mitigation plan involving re-creation of hardbottoms and replacement of seagrass communities and are also within the navigable waters of the United States and are available by navigation servitude.

#### **10. ATTITUDE OF OWNERS.**

All public landowners impacted by the proposed project have been involved in the planning process and have indicated strong support for the project. Upland beach owners are aware of the project and have previously provided temporary construction easements to the Town of Palm Beach, Florida, for the Palm Beach Harbor Navigation Project.

#### **11. MINERALS.**

There are no known minerals of value in the project area.

#### **12. HAZARDOUS, TOXIC AND RADIOACTIVE WASTES (HTRW).**

A phase I environmental assessment was completed for the proposed dredging and disposal activity areas and did not identify HTRW within the areas. Prior to disposal of the dredged material additional testing will occur and contaminated materials will be coordinated with the appropriate environmental agencies and disposed of in accordance with Federal, State and Local laws.

#### **13. INDUCED FLOODING.**

There will be no induced flooding directly associated with this project.

#### **14. ZONING ORDINANCES**

Zoning ordinances are not of issue with this project. Application or enactment of zoning ordinances will not to be used in lieu of acquisition.

#### **15. RELOCATIONS ASSISTANCE (PUBLIC LAW 91-646).**

There are no persons or businesses that will need to be relocated due to project implementation.

## **16. RELOCATIONS, ALTERATIONS, VACATIONS AND ABANDONMENTS (UTILITIES, STRUCTURES AND FACILITIES, CEMETERIES, AND TOWNS).**

There are no known utilities, structures, facilities, cemeteries, or towns to be effected by this project. There is an existing pipeline under the Entrance Channel to service the Sand Transfer Plant. This pipeline is located well beneath the bottom lands and will not be affected by this deepening project.

## **17. STANDING TIMBER AND VEGETATIVE COVER.**

There is no timber or unusual vegetative cover in the project area. Approximately 4.5 acres of seagrass habitat will be impacted by the project that will require mitigation.

## **18. RECREATION RESOURCES.**

There are no separable recreational lands identified for the project.

## **19. CULTURAL RESOURCES.**

There are no known cultural resources that have been identified as being affected by the project. Further investigations will be performed prior to any construction activities.

## **20. OUTSTANDING RIGHTS.**

There are no known outstanding rights in the project area.

## **21. MITIGATION.**

Compensatory mitigation is planned for unavoidable impacts to hardbottom habitats and seagrass communities. Impacts to 4.9 acres of low relief-low complexity (LRLC) hardbottoms are associated with the project deepening and widening. The widening of the entrance channel and existing turning basin will permanently remove 4.5 acres of mixed seagrass beds.

The proposed mitigation plan consists of re-creating between 4.9 and 9.8 acres of hardbottoms and replacing between 8.25 and 11.25 acres of seagrass. Seventeen (17) potential areas within the Lake Worth Lagoon have been identified that have the potential to compensate for the environmental losses from the project. (See Exhibit F-2 for potential mitigation location map).

## **22. ACQUISITION/ADMINISTRATIVE COSTS.**

All costs included in this appendix are considered administrative only and none of the required lands require formal acquisition. The estimate of the Federal real estate acquisition/administrative cost is \$15,000. This figure includes project real estate planning, review and monitoring costs. The non-Federal sponsor will receive credit towards its share of real estate administrative project cost incurred for the recommended plan. Non-Federal administrative costs are estimated to be \$10,000.

## **23. SUMMARY OF PROJECT REAL ESTATE COSTS.**

The following cost figures are subject to change prior to construction:

a. Lands and Damages		\$0
b. Acquisition – Administrative costs		\$25,000
	Federal*	\$15,000
	Non-Federal	\$10,000
c. Public Law 91-646		\$0
d. Condemnations		\$0
e. Total Estimated Real Estate Cost		\$25,000
f. Contingency (23%)		<u>\$ 5,000</u>
g. Total Real Estate Cost with Contingency		\$30,000

\* Includes Corps Real Estate planning and monitoring costs

#### **24. REAL ESTATE ACQUISITION SCHEDULE.**

With no formal acquisition processes required for the recommended plan, no schedule is currently proposed.

#### **25. ESTATES TO BE ACQUIRED.**

There are no estates required for the project.

#### **26. MAPS.**

See Figure F-1 (page F-6) of this appendix for map showing the recommended plan. Exhibit F-2 provides maps referenced within this report.

#### **27. REAL ESTATE CHART OF ACCOUNTS.**

01	Lands & Damages	\$ 0
01AA	Project Planning	\$ 10,000
01B--	Acquisition/Admin	
01B20	By Project sponsor (LS)	\$ 10,000
01B40	Review of Project sponsor	\$ 5,000
01C--	Condemnations	
01C20	By Project sponsor	\$ 0

01C40	Review of Project sponsor	\$ 0	
01E--	Appraisals		
01E30	By Project sponsor	\$0	
01E50	Review of Project sponsor	\$0	
01F--	PL 91-646 Assistance		
01F20	By Project sponsor	\$0	
01F40	Review of Project sponsor	\$0	
01R--	Real Estate Payments		
01R1	Land Payments		
01R1B	By Project sponsor	\$0	
01R2	PL 91-646 Assistance Payments		
01R2B	By Project sponsor	\$0	
<b>TOTAL REAL ESTATE COST EXCLUDING CONTINGENCY</b>			<b>\$25,000</b>
<b>Contingency (23%)</b>			<b><u>\$ 5,000</u></b>
<b>TOTAL REAL ESTATE COST WITH CONTINGENCY</b>			<b>\$30,000</b>

(Contingency costs were formulated from the cost risk analysis).

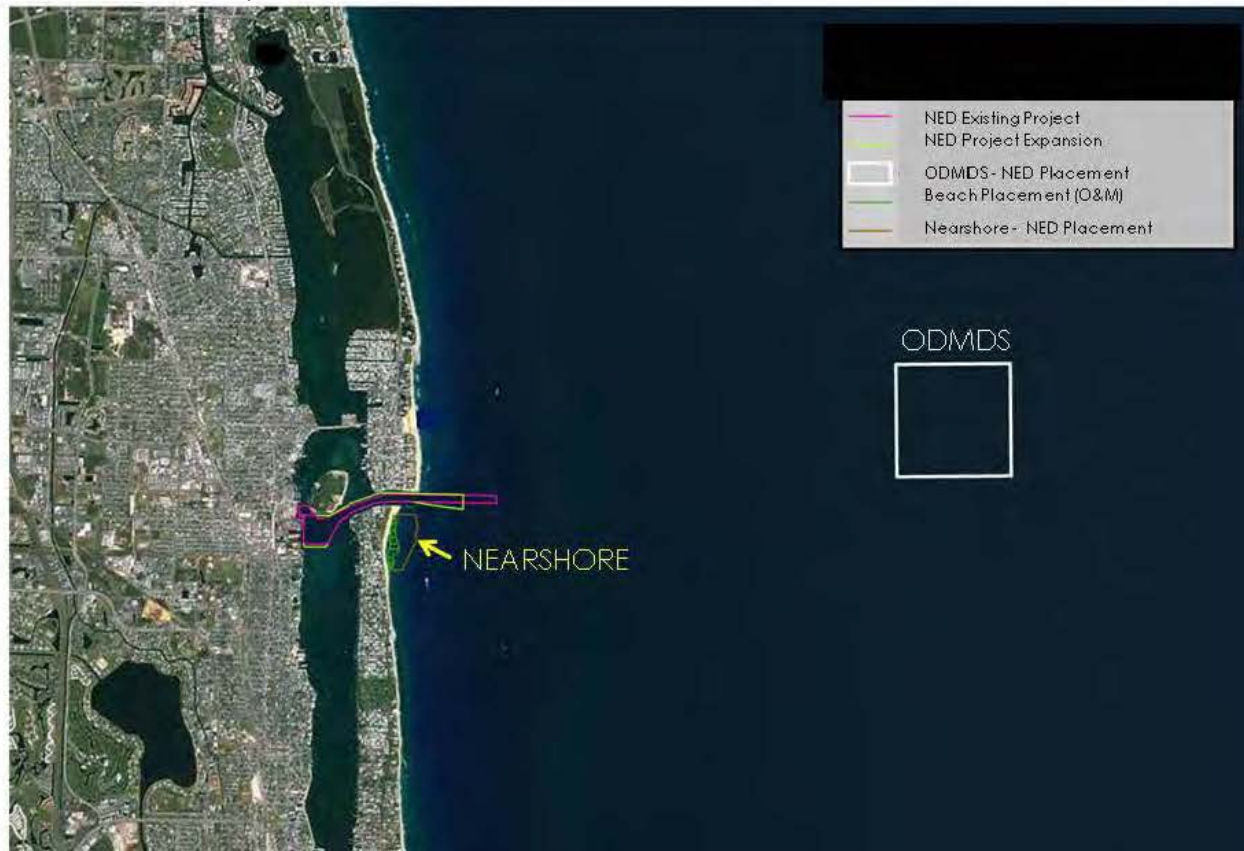
# EXHIBIT F-1

Previous authorizations are as follows:

ACT	WORK AUTHORIZED	DOCUMENTS
March 13, 1934 P.W.A. Program	Maintenance of improvements previously constructed by local interests.	H. Doc 185/73/2
December 10, 1935 P.W.A. Program	Deepening channels and turning basin to 20 feet.	Recommended by COE to P.W.A. October 17, 1934
August 30, 1935	Authorized work previously approved by the P.W.A. and restoration of jetties, removal of south point, revetment of banks, widening of channels, and enlargement of turning basin.	H. Doc. 185/73/2 and R&H Comm. Doc. 42/74/1
March 2, 1945	Deepening channels and turning basin to 25 feet.	H. Doc 530/78/2
May 17, 1950	Extending turning basin southward 550 feet.	H. Doc 704/80/2
July 14, 1960	Deepening channels to 35 and 33 and enlarging turning basin.	H. Doc 283/86/1
November 17, 1986	Maintenance of locally expanded turning basin to a depth of 25 feet on north side of existing basin.	Public Law 99-662
July 11, 1992	Authorized Port of Palm Beach to deepen the northern side of existing basin from 25 feet to 33 feet.	Permit Number: 199130682

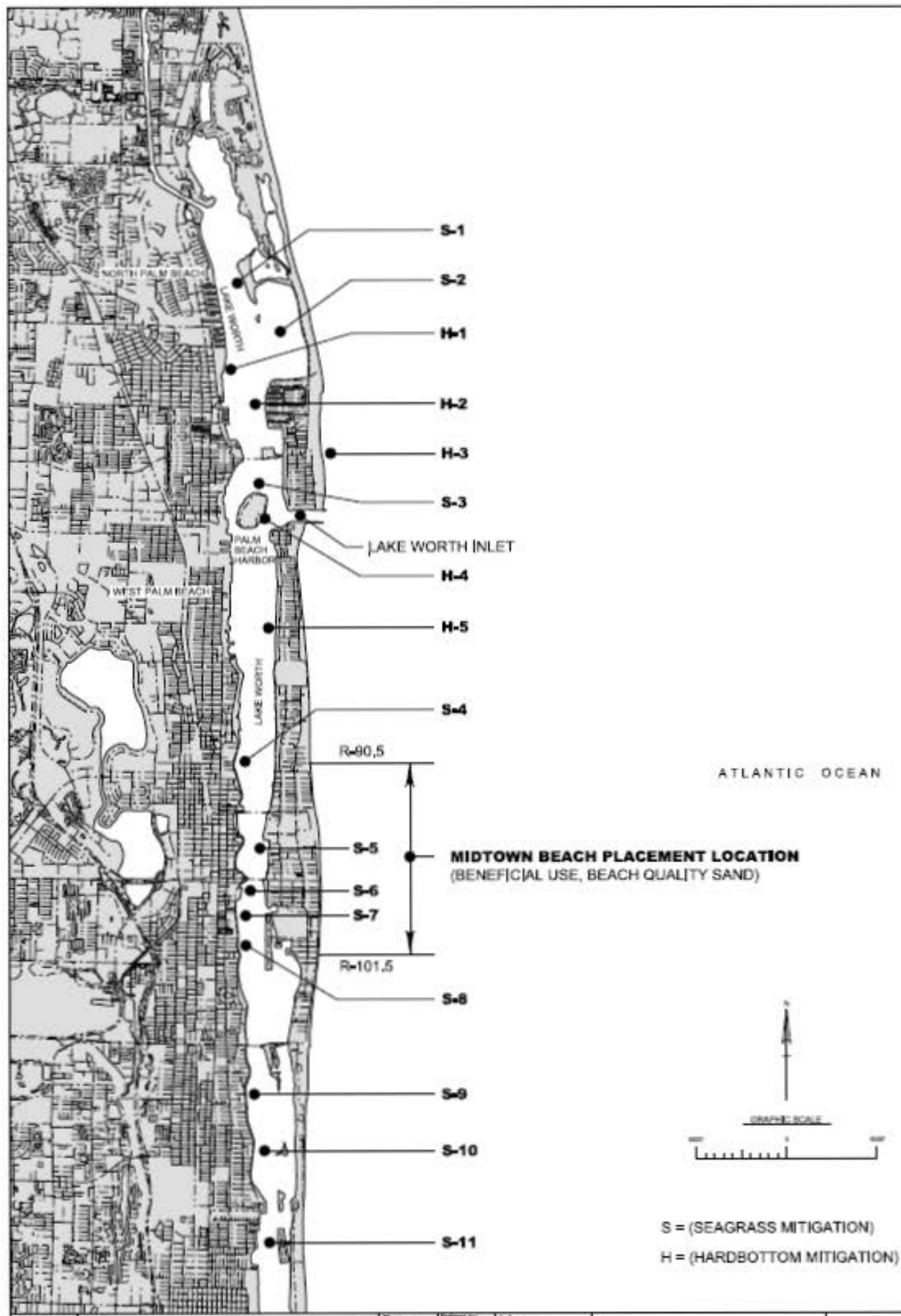
Exhibit F-2

ODMDS Location Map





## Proposed Mitigation Areas







Palm Beach Harbor Federal Real Estate Map (Zoomed in at Inlet)

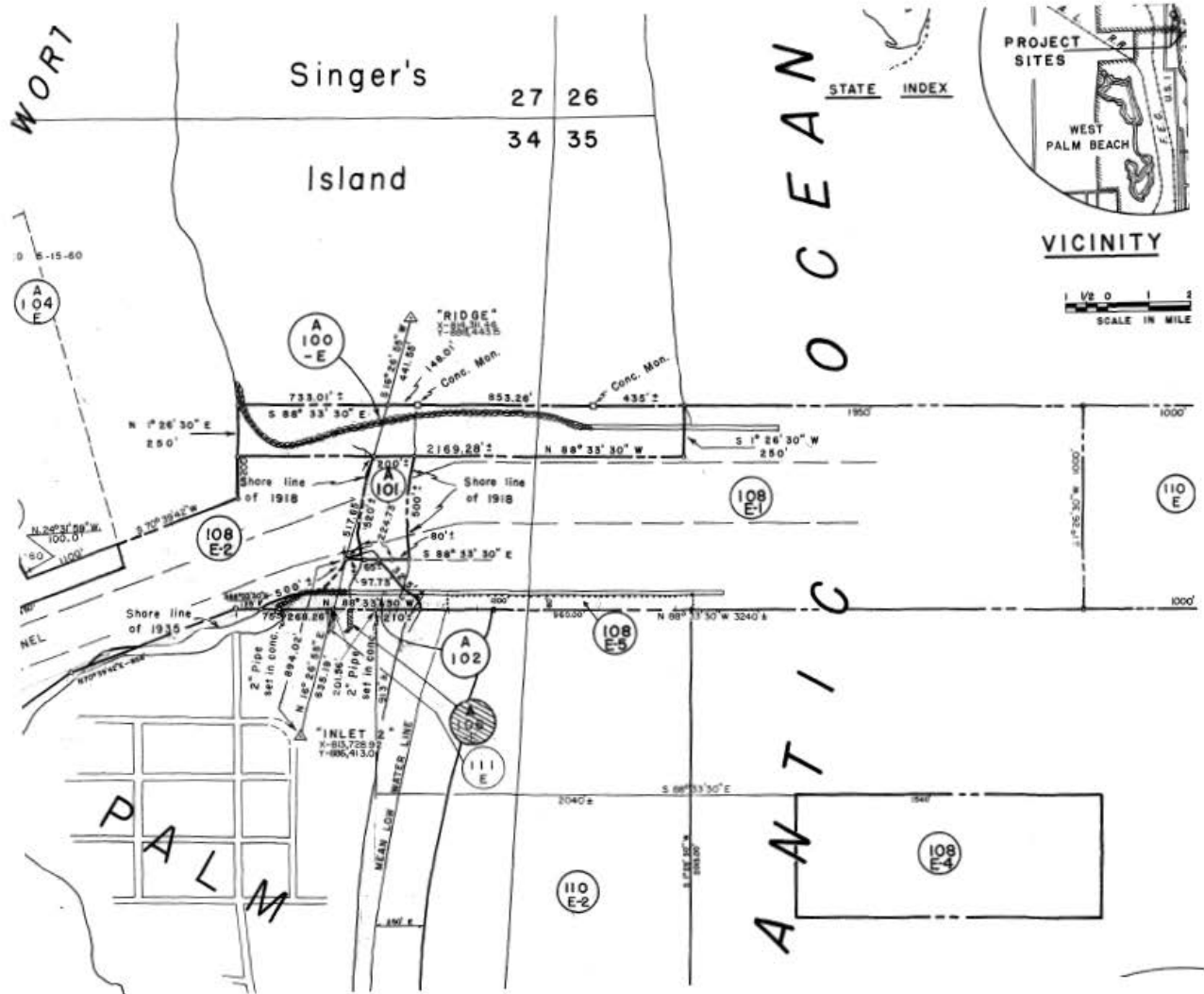


EXHIBIT F-3

**ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY  
FOR LAKE WORTH INLET NAVIGATION PROJECT**

I. Legal Authority:

- a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? **YES**
- b. Does the sponsor have the power of eminent domain for this project? **YES**
- c. Does the sponsor have "quick-take" authority for this project? **YES**
- d. Are any of the lands/interests in land required for the project located outside the sponsor's political boundary? **NO**
- e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? **NO**

II. Human Resource Requirements:

- a. Will the sponsor's in-house staff require technical training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended? **NO**
- b. If the answer to IIa. is "yes," has a reasonable plan been developed to provide such training? **N/A**
- c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? **YES**
- d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule? **YES**
- e. Can the sponsor obtain contractor support, if required in a timely fashion? **YES**
- f. Will the sponsor likely request USACE assistance in acquiring real estate? **NO**

III. Other Project Variables:

- a. Will the sponsor's staff be located within reasonable proximity to the project site? **YES**
- b. Has the sponsor approved the project/real estate schedule/milestones? **YES**

IV. Overall Assessment:

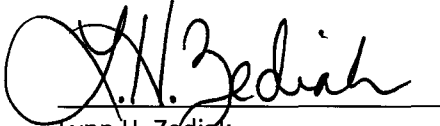
- a. Has the sponsor performed satisfactorily on other USACE projects? **YES**
- b. With regard to this project, the sponsor is anticipated to be: highly capable/fully capable/moderately capable/marginally capable/insufficiently capable. **HIGHLY CAPABLE**

V. Coordination:

- a. Has this assessment been coordinated with the sponsor? **YES**
- b. Does the sponsor concur with this assessment? **YES**

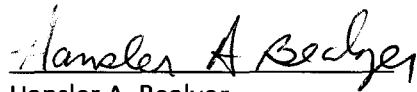
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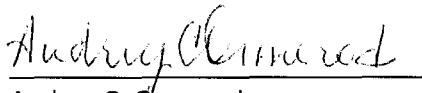
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Chief, Real Estate Division  
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APPENDIX G: Preliminary  
Assessment

LAKE WORTH INLET  
*Palm Beach Harbor*

**Preliminary Assessment Update  
Palm Beach Harbor, Florida**

**National Harbors Program:  
Dredged Material Management Plans**

**January 2014**

**Preliminary Assessment Update  
Palm Beach Harbor, Florida**

**National Harbors Program:  
Dredged Material Management Plans**

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## **1 PROJECT NAME AND DESCRIPTION**

The existing Federal navigation project, authorized in 1960, Lake Worth Inlet, is on the Atlantic Coast of Florida. The closest major ports to Palm Beach Harbor are Port Everglades, in Ft. Lauderdale, and Miami Harbor, approximately 40 miles and 65 miles to the south, respectively. Canaveral Harbor is approximately 90 miles to the north. The entrance channel is through an artificial cut across the barrier beach. An inner channel crosses Lake Worth (a narrow coastal lagoon), and connects the entrance channel to a turning basin at the terminal and transfer facilities of the Port of Palm Beach.

The currently authorized project, provides for:

1. An approach channel 35 feet deep over a bottom width of 400 feet and 0.8 mile long;
2. An inner channel that is 33-foot deep, 300 feet wide, and 0.3 mile long;
3. A main turning basin 33-foot deep over a trapezoidal bottom area with a turning diameter 1400 feet;
4. A secondary turning basin 24 feet deep over an irregular shaped bottom area with a turning diameter of 600 feet;
5. Maintenance of jetties at the channel entrance; and
6. Maintenance of the authorized channel.

Construction of the project included 2 feet of required overdepth in a portion of the entrance channel and turning basin due to rock at project depths. That overdepth was not for advance maintenance but rather to enable more efficient and economical maintenance in the future.

The Sponsor is the Port of Palm Beach District, located at One East 11th Street Suite 600, Riviera Beach, FL 33404, 561-383-4100. The cooperation agreement in effect is a resolution which the Port of Palm Beach District signed on October 21, 1960.

This update will serve the following purpose:

1. To state that the current base plan can accommodate the O&M dredging events for the next 20 year planning horizon.
1. Include the proposed new work widening and deepening project, Lake Worth Inlet Feasibility Study and Integrated EIS, as well as associated operation and maintenance dredging for a 20 year planning horizon.
2. Include historic shoaling from 1994-2019.
3. Provide updated economic analysis
4. Include the additional advance maintenance and expanded settling basin from the Request for Additional Advance Maintenance Package, approved December 2011, as well as the updated recommendation for advance maintenance as proposed in the Lake Worth Inlet Feasibility Study and Integrated EIS.

## 2 AUTHORITY

House Resolution Docket 2559 dated 25 June 1998 authorized the Lake Worth Inlet study:

*“Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army is requested to review the report of the Chief of Engineers on the Palm Beach Harbor, Florida, published as House Document 283, 86th Congress, 1st Session, and other pertinent reports, with a view of determining if the authorized project should be modified in any way at this time, with particular reference to widening the existing interior channel through Lake Worth Inlet.”*

**Table 2-1: OTHER RELATED AUTHORIZATIONS**

ACT	WORK AUTHORIZED	DOCUMENTS
March 13, 1934 P.W.A. Program	Maintenance of improvements previously constructed by local interests.	H.Doc 185/73/2
December 10, 1935 P.W.A. Program	Deepening channels and turning basin to 20 feet.	Recommended by U.S. Army Corps of Engineers to P.W.A., October 17, 1934
August 30, 1935	Authorized work previously approved by the P.W.A. and restoration of jetties, removal of south point, revetment of banks, widening of channels, and enlargement of turning basin.	H.Doc. 185/73/2 and R&H Comm. Doc 42/74/1
March 2, 1945	Deepening channels and turning basin to 25 feet.	H.Doc 530/78/2
May 17, 1950	Extending turning basin southward 550 feet.	H. Doc 704/80/2
July 14, 1960	Deepening channels to 35 and 33 feet and enlarging turning basin.	H.Doc 283/86/1
November 17, 1986	Maintenance of locally expanded turning basin to a depth of 25 feet on north side of existing basin.	Public Law 99-662
July 11, 1992	Authorized Port of Palm Beach to deepen the northern side of existing basin from 25 feet to 33 feet.	Permit Number 199130682

### 3 ECONOMIC ASSESSMENT (2013)

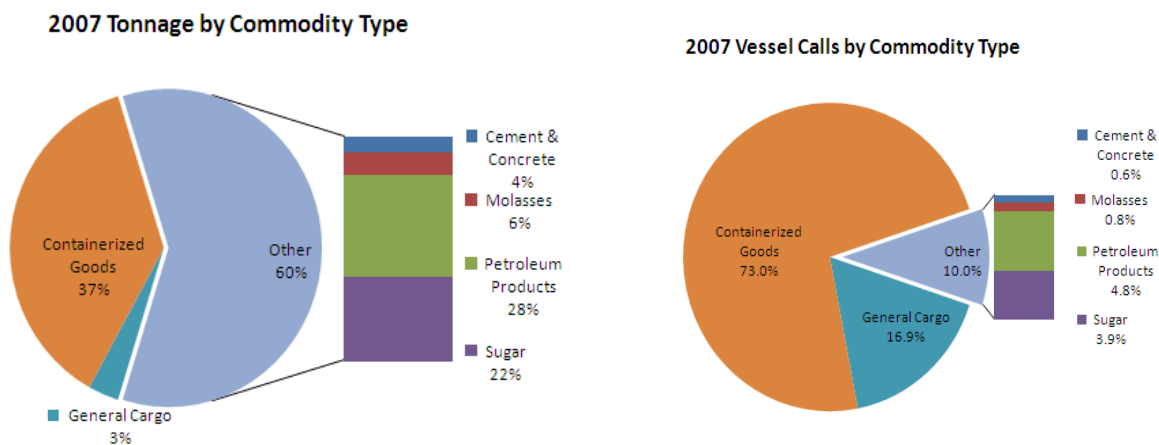
#### OVERVIEW – COMMODITIES

Lake Worth Inlet connects the Palm Beach Harbor to the Atlantic Ocean. The closest major ports to Palm Beach Harbor are Port Everglades, in Ft. Lauderdale, and Miami Harbor, approximately 40 miles and 65 miles to the south, respectively. Canaveral Harbor is approximately 90 miles to the north. The Port of Palm Beach is the fourth busiest container port in Florida and the eighteenth busiest in the continental United States. The port is positioned well for growth due to its access to intermodal capabilities, as well as its acreage available for warehousing. The port has evolved into an export port (one of only 11 in the United States) and is a major nodal point for the shipment of bulk sugar, molasses, cement, utility fuels, water, produce, and breakbulk items. In addition, the Bahamas Celebration cruise ship is based at the port. Located in the heart of south Florida's tourism enclave, the port also serves significant recreational boat traffic.

The Port of Palm Beach, along with its tenants, is an economic engine for the county, state, and nation - contributing \$260 million in business revenue and \$12 million in state and Federal taxes. Over \$7 billion worth of commodities move through the port each year, and approximately 2,400 people are employed directly and indirectly because of the port.

The Port of Palm Beach is a niche port, meaning, a relatively small number of commodities make up a large portion of the total tonnage that transits through the port. For example, cement and concrete, molasses, sugar, and petroleum products represented roughly 10% of vessel calls in 2007. However, these same four commodity groups accounted for almost 60% of total tonnage that year Figure 3-1. In addition to traditional bulk commodities and general cargo, the Port is also home to an overnight cruise service to the Bahamas, a day-cruise that sails twice daily, and a containership operator that services the Caribbean islands on small container vessels. Throughout the following analysis, 2007 data is used as the baseline as it represents a typical level of historical commodity tonnage and vessel calls prior to the economic recession.

**Figure 3-1: Comparison of Tonnage and Vessel Calls by Commodity Type<sup>1</sup>**



<sup>1</sup> Source: Waterborne Commerce Statistics Center, GEC, and Port of Palm Beach Pilots' Log.

Notes: Petroleum Products includes: Residual Fuel Oil, Distillate Fuel Oil, Gasoline, Kerosene, and Asphalt.

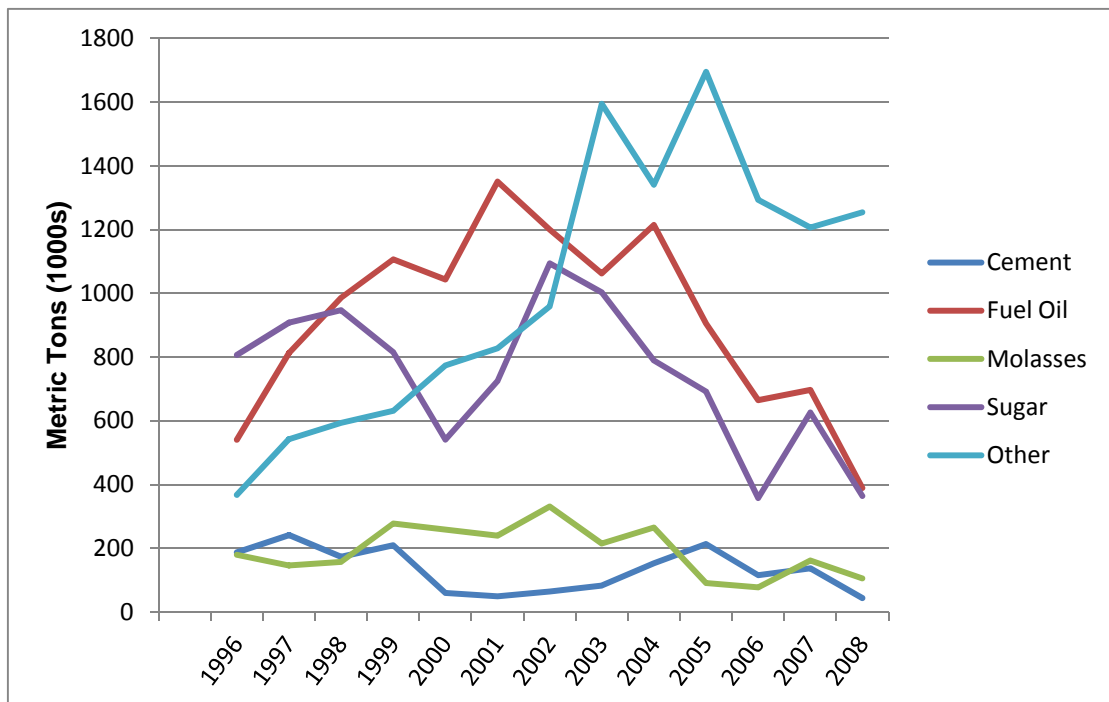


Figure 3-1 depicts the major bulk commodity tonnages for the period 1996 through 2010 that would be associated with the deepest draft vessels calling the port. Total major bulk cargo grew from 1.889 million tons in 1996 to 2.669 million short tons in 2004 for a combined annual growth rate (CAGR) of 4.415 percent. Bulk cargoes declined in 2005-2006 largely related to hurricane and storm disruptions, for example exports of molasses and receipts of fuel oil. Fuel oil has been declining recently due to the closure of the Riviera Beach power generation facility for renovations and modernization. Cement has declined due to the recent housing market price decreases. Not shown on this table is the recent substantial increase in diesel fuel and asphalt tonnage due to a new port tenant who is importing diesel and asphalt.

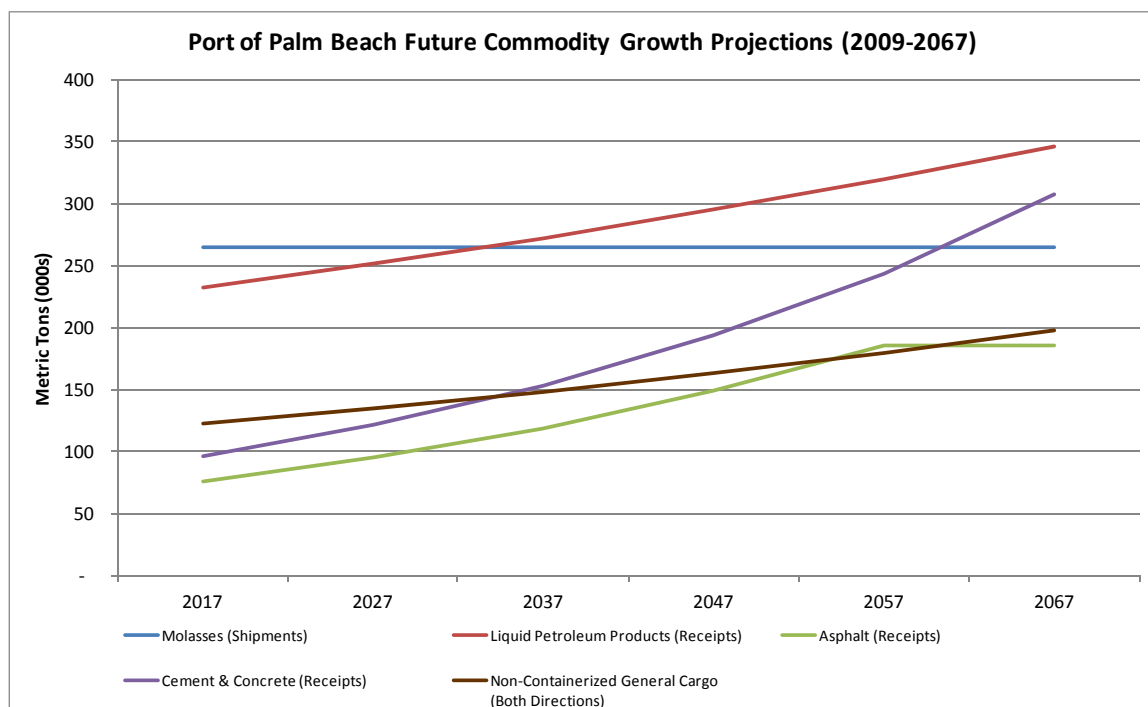
It is important to note that due to the economic recession, the demand for some commodities has temporarily declined, but that it is reasonable to assume that demand would rebound as the economic conditions of the nation improve.

The future commodity growth for a 50-year planning horizon from the base year of 2017 to 2067 is shown graphically in Figure 3-2.

**Figure 3-2: Annual Cargo Tons through the Port of Palm Beach (1996-2009).**



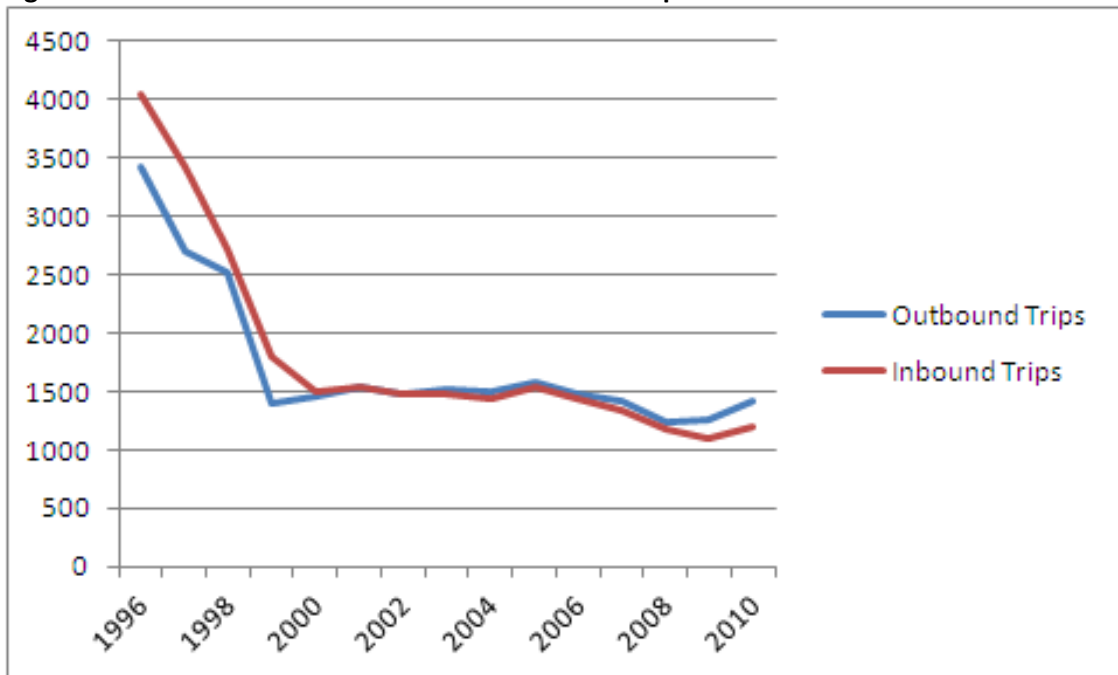
**Figure 3-3: Future Commodity Movement Forecasts for Port of Palm Beach.**



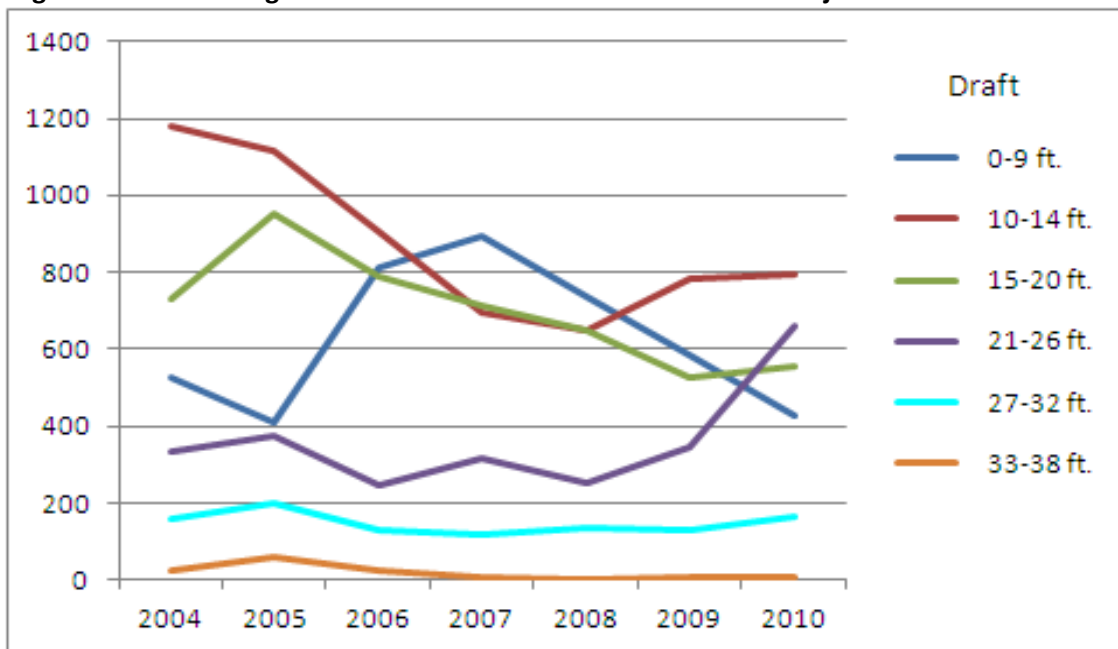
## OVERVIEW - FLEET

Figure 3-3 shows the total annual inbound and outbound vessel trips at the port between 1996 and 2010. The sharp decline in total vessel trips, which occurred between 1996 and 1999, is primarily due to a reduction in small domestic vessel calls. This is also shown by the increase in annual cargo tons during the same period ( Figure 3-2). From 2000 to 2005, annual vessel trips were steady, while cargo tonnage continued to increase from 2000 to 2003, suggesting more cargo was being loaded on the same or larger vessels. Since 2005, both annual cargo tonnage and annual vessel trips have steadily declined. Figure 3-5 shows the number of vessel movements by draft from 2004 to 2010. Note that as the total movements have declined, movements that are 27 feet of draft and above have remained steady from 2006 to 2009 and increased substantially in 2010.

**Figure 3-4: Port of Palm Beach Total Annual Vessel Trips**



**Figure 3-5: Benefiting Vessel Call Forecasts for Future Without-Project**



#### **4 MAINTENANCE DREDGING AND ADVANCE MAINTENANCE**

##### **Summary of 1996 PA:**

Construction dredging occurred in 1938, 1948, 1951, 1965, and 1987. Initial construction of the navigation project involved the dredging of about 1 million cubic yards of material. Historical records indicate about 3.5 million cubic yards of material have been removed since 1950.

Shoals form in two primary areas of the entrance channel. The outer shoal builds up between mile -0.1 and 0.1 and has encroached to the channel centerline in the past. Surveys in 1993 showed depths of 9 to 10 feet northerly of the channel and due east of the north jetty. The predominantly southerly littoral drift moves material down the beach, around the east end of the north jetty and into the channel. The inner shoal builds up between Mile 0.2 and 0.3 with a depth of 28 to 31 feet usually near the center of the channel. Maintenance has been required 12 times for the 1978-93 period and the quantity of material has increased considerably over the past 10 years.

Maintenance dredging for 1991 through 1995 indicates the removal of 395,000 cubic yards from the project over the past 5 years which averages 79,000 cubic yards for that period. The wide variance in the amount of material dredged from year to year is attributed to the port's close proximity to the Gulfstream, and unbuffered susceptibility to storms from the northeast. A survey of the existing Federal project in November 1995 indicated two significant problem areas. Several feet of shoaling located on the south side of the entrance channel at mile 0.0. About 1-foot of shoaling is along the north and eastern sides of the shallower depth turning basin immediately adjacent to Peanut Island.

**Update for 2013 PA:** Historic shoaling rates are shown below (reference Engineering Appendix A, Hydrodynamic Modeling Attachment A). The table shows that shoaling rates have been an average of 114,825 cy annually from 2000 to 2011 (Entrance Channel & Settling Basins - 97,601 cy; Turning Basin - 17,224 cy).

**Table 4-1: Historic Shoaling**

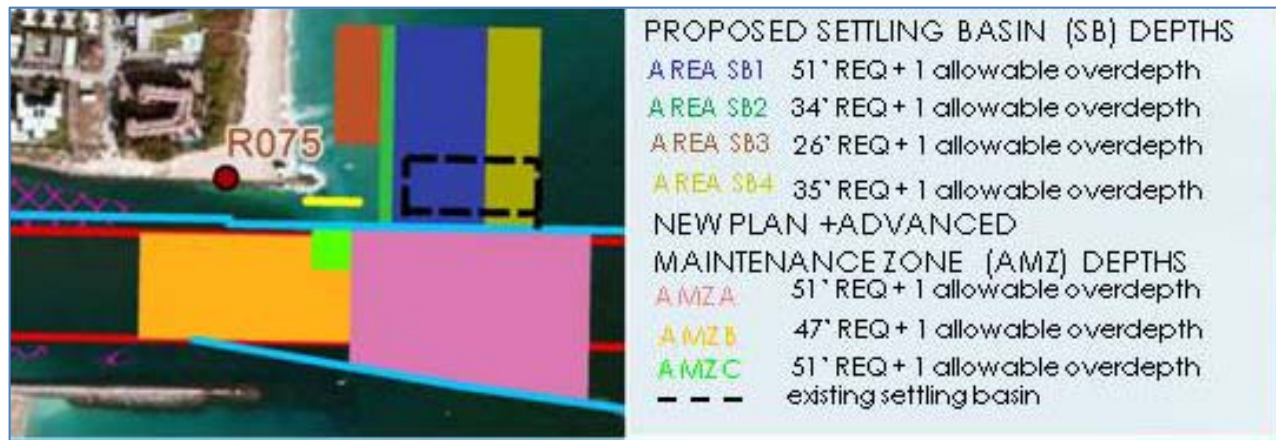
<b>JOB KEY</b>	<b>JOB NAME</b>	<b>END DATE</b>	<b>VOLUME DREDGED (CY)</b>
00SAJ065	PALM BEACH HBR, '00	3/27/2000	124,000
01SAJ160	Palm Beach Hbr, MD	1/11/2001	57,332
02SAJ003	Palm Beach Hbr, MD	3/25/2002	118,450
03SAJ002	Palm Beach Hbr-03, MD	4/29/2003	76,624
04SAJ050	Palm Beach Harbor	5/7/2004	71,285
04SAJ141	Palm Beach Hurricane Emer MD	10/2/2004	504
05SAJ292	Palm Beach Harbor	7/28/2005	305,467
06SAJ005	Palm Beach Harbor	12/9/2005	70,689
06SAJ017	Palm Beach Harbor Emergency	10/3/2006	2,312
07SAJ003	Palm Beach Harbor (FY 07)	4/20/2007	185,000
08SAJ005	PALM BEACH HARBOR	5/20/2008	157,828
09SAJ009	Palm Beach Harbor	12/30/2009	64,068
10SAJ007	PALM BEACH HBR O&M	5/11/2011	144,340
		Total CY =	1,377,899
	Entrance Channel & Sediment Basins =		97,601
	Turning Basins =		17,224
	Annual Average Dredged Volume (CY) =		114,825

High shoaling rates and frequent dredge events (up to 2 times per year) lead to the USACE Approval of the “Request for Additional Advance Maintenance Dredging package”, December 2011, hereafter in this report known as the **December 2011 report**. The approval provided authorization to:

1. Construct an expanded existing settling basin with dimensions 550 feet by 500 feet at a dredging depth of 35' + 2' MLLW.
2. Construct and maintain an additional 2 feet (39'+2' MLLW) of advance maintenance from Sta. 30+00 to Sta. 47+00 in the entrance channel.
3. The December 2011 report stated that the frequency of dredging would be reduced from up to twice a year to once a year, and that an AAEQ savings of \$207,433 would be realized.

Further advance analysis during the Lake Worth Inlet Feasibility Study and Integrated EIS (widening and deepening) determined the following modifications, shown in Figure 4-1 and Table 4-2.

**Figure 4-1: Proposed modifications to Advance Maintenance**



**Table 4-2: All proposed modifications to Federal project and Advance Maintenance**

Location	Required Depth + Overdepth (new construction)	Required Depth + Overdepth (future O&M)	USACE Boundaries (Approximate, based on existing project control)
<b>Feasibility Recommended Plan</b>			
Entrance Channel with widened footprint	43 feet + 1 foot	41 feet + 2 feet	see drawings for widened footprint Rge, Stn (18.0 to 60.0)
Inner Channel with widened footprint	41 feet + 1 foot	39 feet + 2 feet	see drawings for widened footprint Rge, Stn (60.0 to end of Cut-2)
Turning Basin (Main), with 150 foot ext to south and northern notch	41 feet + 1 foot	39 feet + 2 feet	see drawings for widened footprint
Turning Basin (Northern)	unchanged	25 feet + 2 feet	Rge (-500 to 150), Pl Stn (10.1 to 19.6)
<b>Advanced Maintenance</b>			
<i>Settling Basin</i>			
Settling Basin - SB4	35 feet + 2 feet	35 feet + 2 feet	Rge(-40 to -800), Stn(32.0 to 34.0)
Settling Basin - SB1	51 feet + 1 foot	50 feet + 2 feet	Rge(-40 to -800), Stn(34.0 to 37.5)
Settling Basin - SB2	34 feet + 1 foot	33 feet + 2 feet	Rge(-40 to -800), Stn(37.5 to 38.0)
Settling Basin - SB3	26 feet + 1 foot	25 feet + 2 feet	Rge(-350 to -800), Stn(38.0 to 39.75)
<i>Entrance Channel</i>			
Zone A (rectangle)	51 feet + 1 foot	49 feet + 2 feet	Rge(400 to -40), Stn(30.0 to 40.50)
Zone A (trapezoid)	51 feet + 1 foot	49 feet + 2 feet	see drawings for widened footprint Rge, Stn(30.0 to 39.0)
Zone B	47 feet + 1 foot	45 feet + 2 feet	Rge(400 to 00), Stn(39.0 to 47.0)
Zone C	51 feet + 1 foot	49 feet + 2 feet	Rge (125 to -40), Stn (38.75 to 40.50)



These modifications to the advance maintenance plan would have been the proposed plan for the December 2011 report, had the Coastal Modeling System (CMS) been available at that time to model to this level accuracy 10 years ago. The CMS model makes it possible to more accurately predict the sediment transport.

This improved advance maintenance plan is recommended for the existing project, even if the new recommended plan is never built. The improved maintenance plan would normally be incorporated into existing maintenance and funded by the O&M program. However, the O&M program is not authorized to initially fund and construct areas which contain rock.<sup>2</sup> Therefore, this improved maintenance plan is submitted for approval with this feasibility study and this project will fund initial construction of this recommended advance maintenance plan, with the intent that future maintenance of those areas, after they no longer contain rock, will be funded out of the O&M program.

As a result of the improved advance maintenance plan, O&M events will change from dredging approximately 117,500 cubic yards of sand every year on average to approximately 240,000 cubic yards of sand every two years (there will be a 2,500 cubic yard per year increase in shoaling from the project). All material from O&M events is anticipated to be sand and will continue to be placed south of the inlet, on the beach or in the nearshore. The overall estimate is 24 maintenance dredging events (reduced from 50) over the 50-year project life. This reduced frequency of dredging will result in an average annual equivalent savings of savings of \$850,000 (using FY 14 price levels at an FY14 discount rate of 3.5% over 50 years). More information on the shoaling estimates can be found in Engineering Appendix A, Hydrodynamic Attachment A. Refer to Socio-Economic Appendix C for information on the cost savings as a result of the improved advance maintenance plan.

The overall estimate is 24 Maintenance Dredging events over the 50-year project life. The new recommended advance maintenance plan would propose to reduce the frequency of dredging to once every two years (24 maintenance dredging events over a 50-yr period of analysis) to produce an additional AAEQ savings of \$850,000 to the O&M program.

All O&M material is expected to be sandy, and would continue to be placed on the beach and/or nearshore south of the inlet, between R-76 to R-79. The advanced maintenance plan would not create more material; rather, the volume of material would remain the same but the frequency of dredging would be extended from 1 time per year (dredging 117,500 cy per event on average) to 1 time per 2 years (dredging 240,000 cy per event).

Annual maintenance has been performed for roughly 50 years without any issue with disposal capacity at the beach/nearshore. Since this placement area continually erodes it provides adequate capacity and therefore it is not necessary to develop a long term management plan for the new project that is any different than what is being practiced for the existing project.

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<sup>2</sup> ER 1130-2-520, dated 29 November 1996, page 8-1, specifically prohibits the dredging of advance maintenance in rock under the O&M program: "Advance maintenance involving removal of rock is not authorized under the Operation and Maintenance, General appropriation."

## 5 NEW CONSTRUCTION DREDGING

The Lake Worth Inlet Feasibility Study and Integrated EIS proposes the recommended plan which will dredge an initial quantity of approximately 2 million cy in base year 2017. Of that total amount, approximately 1.4 million cubic yards material would be placed in the Ocean Dredged Material Disposal Site (ODMDS); roughly 125,440 cubic yards of material would be used for seagrass mitigation; and roughly 450,000 cubic yards of sand would be placed in the nearshore south of the inlet. The quantity of material to be dredged, and associated placements sites, are shown in Table 5-1 :

**Table 5-1: New construction quantities and placement sites**

Item	Quantity (cy)	Placement	Classification
<b>Dredging Volumes</b>			
<i>(Federal)</i>			
Entrance Channel to STA 45+00	285,404	nearshore	Sand and Silty Sands
Entrance Channel (west of STA 45+00)	145,767	ODMDS	Rock, Interfingering Layers
Inner Harbor	910,129	ODMDS	Rock, Interfingering Layers
Inner Harbor	125,440	Seagrass Mitigation	Sand and Silty Sands
Advance Maintenance	172,700	nearshore	Sand and Silty Sands
Advance Maintenance	12,000	ODMDS	Rock, Interfingering Layers
Settling Basin Expansion	258,000	ODMDS	Rock, Interfingering Layers
<b>TOTAL DREDGING QUANTITIES</b>	<b>1,897,750</b>		

## 6 DREDGED MATERIAL DISPOSAL SITE CAPACITY AND USAGE

### **Summary of 1996 PA:**

Most of the dredging in Palm Beach Harbor has been in navigable waters of the United States. Historically, four areas were in use for disposal of dredged material as follows:

- In an {interim} ocean dredged material disposal site (ODMDS);
- On the beach south of the inlet;
- On Peanut Island; and
- Along a near shore area south of the inlet.

**Interim ODMDS:** Existing records from 1970 to 1984 indicate the dredged material from the channel and turning basin maintenance went into an ODMDS with a depth of 17 feet. The sand transfer plant moved material from north of the inlet to south of the inlet.

**Beach:** From 1984 to 1996, suitable material from the maintenance of the project went on the beach. The State of Florida and the sponsor want to put as much suitable material as possible on the beach. Roughly 395,000 cy of material went on nearby beaches {permitted template} from 1991-1995. Sediment testing in the past indicates that channel shoal material is suitable for beach disposal. No pollutants or unacceptable amount of fines are in that material to prevent beach placement. As long as the material is suitable, beach disposal is good for over 20 years in order to keep material in the littoral drift. Renourishment of the beach is important also as mitigation for the inlet impacts on the littoral drift material.

**Peanut Island:** Peanut Island is an artificial island comprising about 5.8 million cubic yards of dredged material. It has two owners, the Florida Inland Navigation District (FIND) and the Port of Palm Beach. FIND owns the northern portion of Peanut Island, while the Port of Palm Beach owns the southern portion of the island.

**Beneficial Use:** Beneficial uses are dredged material to improve the environment usually involves fill for habitat restoration. A borrow pit with depths of 30 feet and located 2.5 miles west of the project was identified but is currently filled to capacity.

**Programmed Maintenance Dredging Summary:** The programmed amount of dredged material averages 100,000 cy each year, from 1996 to 2005, and the annual maintenance cost is projected to be \$1.7 million.

#### **Update for 2013 PA:**

**Disposal Options – Will remain the same as PA 1996. Only new difference is new construction and new advance maintenance construction.**

The interim ODMS site has been replaced with a new ODMS site, located approximately 4.5 miles east of Lake Worth Inlet. The new ODMS has been used once for 3,500 cy of material during an O&M event. The permitted beach template and nearshore area still remain active. The FIND site on Peanut Island is unlikely to be of use to the USACE, and it of limited capacity. The Port of Palm Beach owns the southern portion of Peanut Island, but capacity is limited. To be of use, this site would need to be expanded by dike raising, and the cost would likely be cost prohibitive.

#### **Updated List:**

- a. In the new ocean dredged material disposal sites (ODMS);
- b. On the beach south of the inlet;
- c. Along a near shore area south of the inlet;
- d. Midtown Beach Placement
- e. Beneficial use options

**ODMS:** The 2004 Site Management and Monitoring Plan (SMMP)<sup>3</sup> states the following: “The capacity of the Palm Beach Harbor ODMS has not been determined. Modeling conducted by the Coastal Engineering Research Center (CERC) was conducted for a single project volume up to 500,000 cubic

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<sup>3</sup> The SMMP was updated in 2009 with revisions, but this requirement was transferred with the update.

yards. Therefore, use of the ODMDS will be restricted to 500,000 cubic yards of dredged material per project. Projects in excess of 500,000 cubic yards of dredged material will require additional capacity studies prior to utilization of the ODMDS.”

During USACE coordination with USEPA throughout this feasibility study (2012), USEPA noted that the original purpose of the ODMDS was for maintenance material, and that the estimated 1.4 million cubic yards which would be dredged and placed in the ODMDS for the recommended plan is beyond the intent of the ODMDS design. As a result, per conversations with USEPA, USACE will conduct a modeling study to look at the distribution of the proposed material (rock and sediments) to determine the resulting footprint on the seafloor and associated mounding, and the results will be known prior to PED phase. There is more than enough actual vertical capacity at this site, which is 1 nmi<sup>2</sup> in approximately 525-625 feet of water, and which has only been used once to date for approximately 3,500 cubic yards of dredged material. EPA’s concern is whether the material will fit within the aerial footprint when placed, rather than if there is enough vertical capacity.

Should materials exceed the ODMDS footprint, site expansion could be determined necessary. Based on the existing site configuration and conditions at the Palm Beach ODMDS and the amount of proposed dredged material from the recommended plan, it is not likely (low risk) that an ODMDS expansion would be necessary for this site. Reference the Lake Worth Inlet Feasibility Report and Integrated EIS, Section 4.10 Risk and Uncertainty for more discussion of low risk.

In addition, prior to solicitation of the construction contract and subsequent disposal in the ODMDS, the USACE will assess the dredged material to determine if it meets the Ocean Dumping Criteria in 40CFR226, in accordance with the 2009 Palm Beach ODMDS SMMP.

**Beach:** The State of Florida and the sponsor want to put as much suitable material as possible on the beach. Sediment testing in the past indicates that channel shoal material is suitable for beach disposal. No pollutants or unacceptable amount of fines are in that material to prevent beach placement. Renourishment of the beach is important also as mitigation for the inlet impacts on the littoral drift material.

The placement of beach quality material from R-76 to R-79 (above the MHW line to vegetation) is currently being done for operation and maintenance material and will likely continue to be done in the future for operation and maintenance material; however, placing material above the MHW line for the new feasibility project would incur large real estate costs, which would not make it a least cost placement options. Therefore, this option is not considered to be part of the recommended plan.

**Nearshore:** Roughly 450,00 cy of new construction material of nearshore quality is expected to be placed during the initial construction of the recommended plan. The nearshore can accept a lesser percent of fines than the beach and is a valuable way to keep sand in the natural system while abiding by state standards. Near shore quality sand would be placed in the near shore (below the MHW line) between DEP range monuments R-76 to R-79. This is a least cost placement option and also allows beneficial use of the material for recreation and wildlife, which is an incidental benefit. The nearshore can accept all sandy material from the new project, as well as ongoing maintenance material.

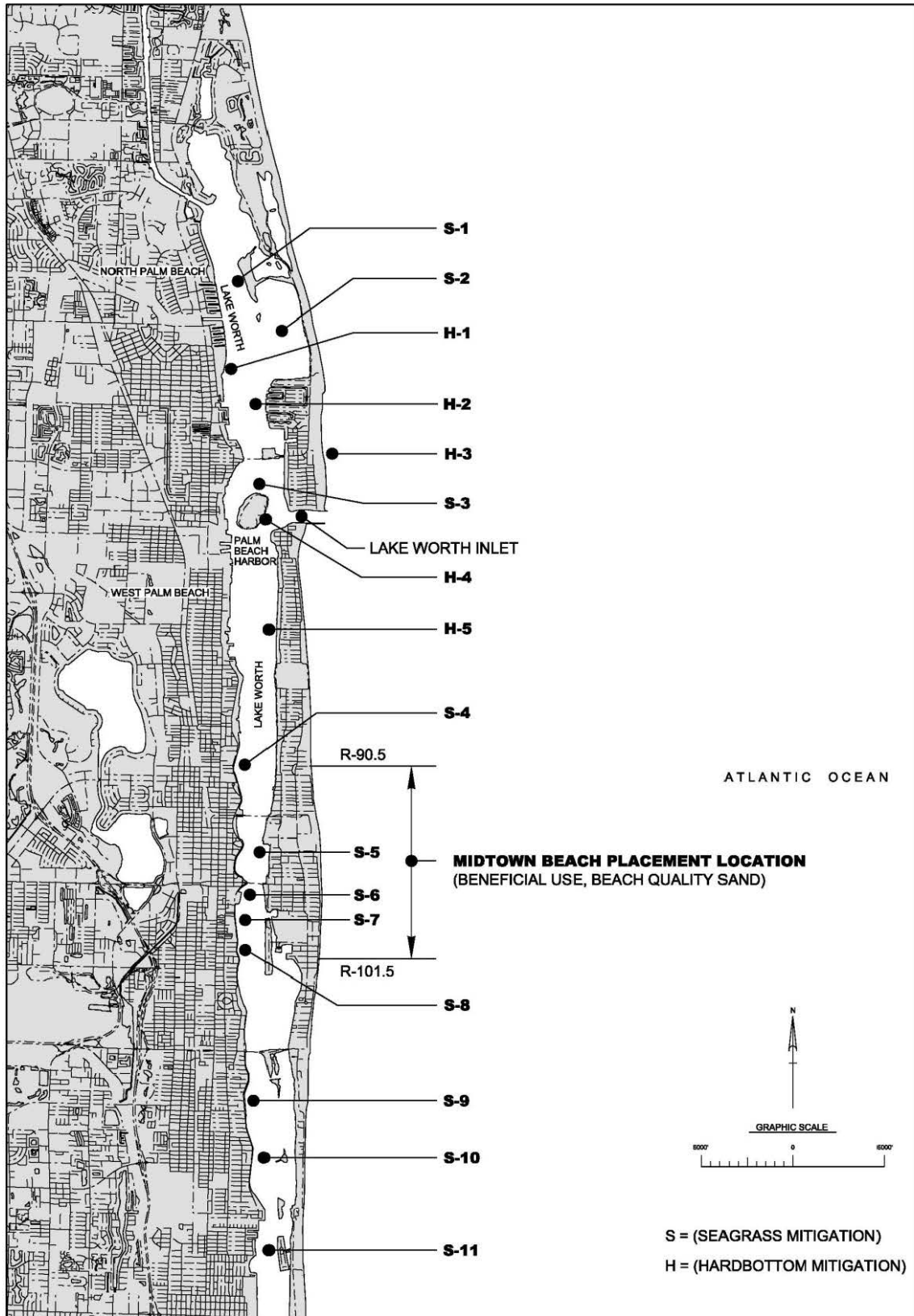
**Beneficial Use:** Several beneficial use areas exist within the lagoon area and capacities greatly vary. However, there is not one particular beneficial site which would be able to accept all of the material for

the new construction project. For this reason, beneficial use sites will be considered when capacity, material type, and availability are appropriate. Beneficial use sites are a part of the base plan when they are least cost.

The placement of beach quality material from R-76 to R-79 (above the MHW line to vegetation) is currently being done for operation and maintenance material and will likely continue to be done in the future; however, placing material above the MHW line for a new project would incur large real estate costs, which would not make it a least cost placement options. Therefore, this option is considered beneficial use for the new construction project.

Other opportunities exist in the project vicinity such as the filling of anoxic deepwater holes in Lake Worth Inlet Lagoon, creation of habitat for submerged aquatic vegetation such as seagrasses and/or placement or at the Mid-Town beach placement area. It is not anticipated that these alternative forms of disposal will result in any cost savings to the project; however, if cost increases are considered small or if there is a non-federal interest in paying for any increased cost difference, these alternatives are preferable and could be further developed and incorporated into the project during the pre-construction, engineering, and design phase (PED). The list of currently identified potential beneficial use sites are shown below in Figure 6-1.

Figure 6-1: Potential Beneficial Use Sites



## **7 ENVIRONMENTAL COMPLIANCE**

An Environmental Assessment (EA) on the effects of maintenance dredging the project and disposal of materials is on file with the U.S. Environmental Protection Agency (EPA). An Environmental Impact Statement (EIS) is integrated into the report for the new construction project. In the project area, wildlife includes a wide variety of shore and sea birds, small mammals, reptiles, amphibian and fishes. Threatened-to-endangered species that are often found in the project area are listed below: Mammals (manatee); Birds (Bald eagles, Red-cockaded woodpecker, Eastern brown pelican); Reptiles (American crocodile, Alligator, Green sea turtle, Loggerhead sea turtle).

Manatees frequent the heated water discharge area at the Florida Power and Light Company's Riviera Beach Station located just south of the project. Some of those manatees could pass areas undergoing maintenance dredging. Maintenance dredging contracts for the area include cautionary requirements for manatees.

## **8 CONCLUSIONS**

Preliminary assessment of the Palm Beach Harbor plan for disposal of the shoal material indicates no major problems for the foreseeable dredging cycle. Future dredging cycles for the existing federal project and project induced shoaling may use the areas including the beach, nearshore, ODMDS, and beneficial use sites, when appropriate and when cost increment is paid for by a non-federal sponsor.

Almost all the material from the entrance channel is suitable for beach placement. Future placement of most material is likely to continue going on the beach as the State and sponsor strongly support that method. The beach disposal area has not had a capacity problem in the past and is not likely to have one in the next 20 years or more. The ODMDS and nearshore have sufficient capacity for the new construction dredging.

The economic viability of Palm Beach Harbor is not in question at the present time. Continued maintenance is essential to the movement of cargo through terminals in the harbor. Port related industries have a significant investment in terminals and infrastructure to handle the tonnage volume.

Environmental compliance does not appear to be in question. Water Quality Certification (WQC) is current with periodic environmental assessments.

## **9 RECOMMENDATIONS**

Continued maintenance of this project is warranted on the basis of project usage and indicators of economic productivity, sufficient potential disposal capacity, and maintenance activities in compliance with current applicable laws and regulations for the next 20 years. Therefore, no additional dredged material management plan is necessary beyond this assessment.